

UNITED STATES GOVERNMENT

Memorandum

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TO : The Files: [REDACTED]

DATE: 21 January 1963

FROM : [REDACTED]

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SUBJECT: Trip Report - Demodulator Test Program with [REDACTED]

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1. Project Description:

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This project will compare the field performance of the seven-bit Barker coder system (CV-17), a conventional FSK Demodulator [REDACTED] and a linear demodulator incorporating the Page Decision Threshold Computer.

2. Contractual Information:

a. Initial Cost: [REDACTED]

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b. Initiation Date: 1 July 1962

c. Completion Date: December 1962 Extension (1) 1 March 1963

d. Deliverable Items: A Comprehensive Engineering/Field Test Report

3. Date of Meeting: 18 January 1963

4. Place of Meeting: [REDACTED]

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5. Persons Attending:

Agency

Non-Agency

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Mr.

Mr.

Mr.

Mr.

Mr.

Mr.

6. Contractor's Performance:

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a. On Schedule and expected to remain so: Yes

b. Within Obligated Funds and expected to remain so: Yes

c. Satisfactory Technical Progress: Yes

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7. Project Status:

[REDACTED] conducted a briefing of the proposed system test and a demonstration of the equipment/system configuration.

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The test plan furnishes a program to be used to evaluate the relative error rate performance of the three teletype demodulators. The test circuit consists of an HF path of approximately 1,430 miles from Boulder, Colorado to Leesburg, Virginia.

The converters will be tested in sequence, each for eight minutes every half hour, with the remaining time to be used to test the HF path conditions. The frequency shift keyer at the transmit end is programmed to automatically transmit the following code sequence:

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1. One-half minute off
2. Sixteen minutes of standard alternating mark-space code at an 81.63 baud-rate, 850 cps shift suitable for demodulation by the [REDACTED] and [REDACTED] converters.
3. One minute off
4. Eight minutes of Barker encoded alternating mark-space at an 81.63 baud-rate, 1250 cps shift suitable for demodulation by the Sylvania converter.
5. One minute off
6. Three minutes of on-off keying of the carrier for multipath delay measurements.
7. One-half minute off

The off time will be used to monitor the noise level at the receiver. The on-off keying of the carrier, item six in the above sequence will be used to monitor the multipath delay at the receiver by photographing the IF output of the receiver.

An automatic timer which changes the power output of the transmitter has also been incorporated into the frequency shift keyer. There are four possible power programs which can be selected. These are:

1. Program A changes the power in 3db steps, each for a half hour, from full power output to 9db down, a two hour cycle, and then recycles.
2. Program B changes the power in 3db steps to 6db down, an hour and a half cycle and then repeats the 6db down step for a half hour before recycling.

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SUBJECT: Demodulator Test Program [REDACTED]

3. Program C changes from full power output to 3db down, each for a half-hour, and then recycles.
4. Program D presents full power output continuously.

The code sequence shown above is transmitted synchronously with each of the half-hour steps in power output. Full power output and the first code sequence will begin at 0830 MST. It will then be possible, at the receiver end to determine which phase of the code sequence or power program is being transmitted by determining the correct time at the transmitter.

At the receive end, the following data will be taken; the incoming signal level, the error count for each of the three demodulators, the multipath delay, and the noise level. It will then be possible to decide whether to change the transmitted carrier frequency and power program with respect to the performance of the demods. If, for instance, power program A is being used and the 6 and 9 db steps of power prove to be too low for all three demods, then another power program will be initiated. If, on the other hand, all equipments appear to be working well, it may be desirable to change the operating frequency to a lower one (8.4, 11.4 and 14.4 MCS have been allocated) in order to enhance the multipath and to provide a more stringent test of the demodulators. The test plan provides for the first week of testing to be during the day, the second at night, and the third during the day.

Both the [REDACTED] representatives had an opportunity to observe the system configuration plus the opportunity to optimize their respective equipments. They both agreed that the CV-17 and the [REDACTED] DTC were being given a fair test.

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[REDACTED] estimates that the actual field tests will begin no earlier than a period of two weeks (4 February) or later than three weeks (11 February). During this interim period the equipment will be sent to the receive and transmit site. An opportunity is afforded to any interested parties to observe the actual field test at the Leesburg site (Receive) by contacting the undersigned. A block diagram of the system configuration is available in the Contract file.

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